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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,855	11/07/2005	Toshinori Ota	P/2850-120	4391

2352 7590 09/02/2010

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EXAMINER	
MOWLA, GOLAM	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
09/02/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/555,855	OTA ET AL.	
	Examiner	Art Unit	
	GOLAM MOWLA	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-116* is/are pending in the application.

4a) Of the above claim(s) *2,4,6-14 and 16-116* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5 and 7-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/23/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *See Continuation Sheet*.

Continuation of Attachment(s) 6). Other: Online Machine Translation of JP2000-286471 A provided by The Industrial Property Digital Library (IPDL) (http://www.ipdl.inpit.go.jp/homepg_e.ipdl).

FINAL ACTION

Information Disclosure Statement

1. The information disclosure statement filed on 07/23/2010 lists the same references as the IDS filed on 09/01/2006 with only exception being IDS dated 07/23/2010 fixes the publication date of two foreign references and publication number of one foreign reference. Applicant is suggested to provide a separate information disclosure statement including only these three references.

Response to Amendment

2. Applicant's amendment of 07/23/2010 does not place the Application in condition for allowance.

3. Claims 1-116 are currently pending. Applicant has amended claims 1, 3, 8 and 12-13. Claims 2, 4, 6-14 and 16-116 are withdrawn from consideration as being part of non-elected invention.

Status of the Objections or Rejections

4. Due to Applicant's amendment of claims 1, 3, 8 and 12-13, all rejections from the office Action dated 03/01/2010 are withdrawn. However, upon further consideration, a new ground of rejection is presented below.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1, 3, 5 and 7-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1, 3, 8 and 12, as amended, recite the limitation "wherein when the raw alloy in molten form is contacted with a surface of a cooling member so as to form the plate shaped raw thermoelectric semiconductor materials, a rotational roll is used as the cooling member and is rotated so that the circumferential velocity of the rotational roll is **less than 2m/sec**", which excludes the circumferential velocity of **2m/sec**. MPEP at §2173.05(i) clearly states that "exclusionary proviso must have basis in the original disclosure." However, the Applicant's disclosure as filed does not provide support such exclusion, i.e., Applicant's disclosure does not provide support for the circumferential velocity of the rotational roll being "**less than 2m/sec**". Instant specification on page 31 discloses that "the circumferential velocity is no higher than 2 m/sec" (page 31, lines 8-9), which implies that the circumferential velocity is 2 m/sec or less (≤ 2 m/sec). However, there is no disclosure of a circumferential velocity of "**less than 2m/sec**" being specifically contemplated in the specification as originally filed. The disclosure of page 31 in lines 8-9 makes it clear that Applicant wished to utilized a circumferential velocity of 2 m/sec

or less (≤ 2 m/sec). Thus, Applicant's disclosure fails to provide support for the exclusionary proviso (the circumferential velocity of **2m/sec** as being excluded).

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1, 3, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horio et al. (JP 2003-037302 A) (hereafter "Horio '302") in view of Horio et al. (JP 2000-286471 A) (hereafter "Horio '471").

Regarding claims 1 and 3, Horio '302 is directed to a thermoelectric semiconductor material (see [0019-0035] and [0047]) (figs. 1, 6, 7 and 9) produced by: adding excess Te to a predetermined stoichiometric composition of a compound thermoelectric semiconductor to form a raw alloy (see [0055], table 5, example 10); layering and packing plate shaped raw thermoelectric semiconductor materials 14 made of a raw alloy having a predetermined composition of a thermoelectric semiconductor to form a layered body; solidifying and forming the layered body to form a compact body 61 (see fig.9c); applying pressure by forging to the compact body 61 in a uniaxial direction that is perpendicular to a layering direction of the raw thermoelectric semiconductor materials 14, and thereby plastically deforming the compact body 61 by applying a shear force in a uniaxial direction that is approximately parallel to the main layering direction of the raw thermoelectric semiconductor materials 14 (see figures 9c and [0035] and [0047]).

However, Horio '302 is silent as to whether when the raw alloy in molten form is contacted with a surface of a cooling member so as to form the plate shaped raw thermoelectric semiconductor materials, a rotational roll is used as the cooling member and is rotated so that the circumferential velocity of the rotational roll is less than 2m/sec.

Horio '471 directed to a method of manufacturing thermoelectric semiconductor materials, has particularly disclosed the following (see para.0022 of the description; and figs. 1-4): defining the peripheral speed of the rotatable roller at 2-80m/s, with an object to form raw thermoelectric semiconductor materials of high crystallinity. That is, Horio '471 provides technical suggestion of defining peripheral speed of the rotatable roller to improve crystallinity.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to have utilized the teaching of Horio '471 in making the thermoelectric semiconductor material of Horio '302 such that a rotational roll is used as the cooling member and rotated at an the optimum circumferential velocity of the rotational roll determined by routine experimentation such that thermoelectric semiconductor materials contain high crystallinity, as taught by Horio '471, and since it has been held that discovering an optimum value for a result of effect variable involves only routine skill in the art (MPEP § 2144.05 (II)).

Regarding claims 5 and 7, the reference further discloses that the stoichiometric composition of the compound thermoelectric semiconductor is a $(Bi\text{-}Sb)_2Te_3$ or $Bi_2(Te\text{-}Se)_3$ based composition ([0017] and [0023]).

9. Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (US 6,274,802) in view of Horio et al. (JP 2003-037302 A) (hereafter "Horio '302") and Horio et al. (JP 2000-286471 A) (hereafter "Horio '471").

Regarding claims 8 and 12, Fukuda is directed to a thermoelectric module comprising PN element pair (5 and 6) (fig. 12) (1: 26-37 and 2:35-10:5), produced by plastically deforming (see abstract) respectively plate shaped raw thermoelectric semiconductor materials made of a raw alloy comprising a composition of P type thermoelectric semiconductor, and plate shaped raw thermoelectric semiconductor materials made of a raw alloy comprising a composition of N type thermoelectric semiconductor to form P type and N type thermoelectric semiconductor materials (see abstract and fig. 12 and 12:25-16:24); cutting out P type and N type thermoelectric semiconductor elements 5, 6 from the P type and N type thermoelectric semiconductor materials (9: 59-62 and 12:25-16:24) so that planes perpendicular to film thickness can be used as contact surfaces with an electrode (7); arranging the P type and N type thermoelectric semiconductor elements (5 and 6) in a crystallographic orientation of high thermoelectric capacity; joining the P type and the N type thermoelectric semiconductor elements 5, 6 via a metal electrode 7 to form a PN element pair, said thermoelectric module having a structure provided with said PN element pair.

However, the reference is silent as to layering and packing respectively the raw thermoelectric semiconductor materials, and solidifying and forming them to form compacts; applying pressure to the compacts having the compositions of P type and N type thermoelectric semiconductor in an axial direction perpendicular or approximately perpendicular to a main layering direction of the raw thermoelectric semiconductor materials; and thereby applying shear force in an axial direction approximately parallel to the main layering direction of the raw thermoelectric semiconductor materials for plastically deforming manufacturing

Horio '302 is directed to a thermoelectric semiconductor material, (see paras.0019-0035 and 0047 of the description; and figs. 1, 6, 7 and 9) produced by: adding excess Te to a predetermined stoichiometric composition of a compound thermoelectric semiconductor to form a raw alloy (see [0055], table 5, example 10); layering and packing plate shaped raw thermoelectric semiconductor materials 14 made of a raw alloy having a predetermined composition of a thermoelectric semiconductor to form a layered body; solidifying and forming the layered body to form a compact body 61 (see fig.9c); applying pressure by forging to the compact body 61 in a uniaxial direction that is perpendicular to a layering direction of the raw thermoelectric semiconductor materials 14, and thereby plastically deforming the compact body 61 by applying a shear force in a uniaxial direction that is approximately parallel to the main layering direction of the raw thermoelectric semiconductor materials 14 (see figures 9c and [0035] and [0047]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the method of Horio '302 in the thermoelectric module production method of Fukuda to manufacture P- and N-type thermoelements with high performance index (see abstract of Horio '302).

However, Fukuda in view of Horio '302 is silent as to whether when the raw alloy in molten form is contacted with a surface of a cooling member so as to form the plate shaped raw thermoelectric semiconductor materials, a rotational roll is used as the cooling member and is rotated so that the circumferential velocity of the rotational roll is less than 2m/sec.

Horio '471 directed to a method of manufacturing thermoelectric semiconductor materials, has particularly disclosed the following (see [0022] of the description; and figs. 1-4):

defining the peripheral speed of the rotatable roller at 2-80m/s, with an object to form raw thermoelectric semiconductor materials of high crystallinity. That is, Horio '471 provides technical suggestion of defining peripheral speed of the rotatable roller to improve crystallinity.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to have utilized the teaching of Horio '471 in making the thermoelectric semiconductor material of Horio '302 such that a rotational roll is used as the cooling member and rotated at an the optimum circumferential velocity of the rotational roll determined by routine experimentation such that thermoelectric semiconductor materials contain high crystallinity, as taught by Horio '471, and since it has been held that discovering an optimum value for a result of effect variable involves only routine skill in the art (MPEP § 2144.05 (II)).

Regarding claims 9-11 and 13-15, the references further disclose that the stoichiometric composition of the compound thermoelectric semiconductor is a $(Bi\text{-}Sb)_2Te_3$ or $Bi_2(Te\text{-}Se)_3$ based composition (see 16: 11-24 of Fukuda) (see also [0017] and [0023] of Horio '302).

Response to Arguments

10. Applicant's arguments with respect to claims 1, 3, 5 and 7-15 have been considered but are moot in view of the new ground(s) of rejection as necessitated by the amendments.

On pages 1-2 of Remarks, Applicant argues that each of the cited references (Fukuda and Horio '302), alone or in combination, fails to disclose when the raw alloy in molten form is contacted with a surface of a cooling member so as to form the plate shaped raw thermoelectric semiconductor materials, a rotational roll is used as the cooling member and is rotated so that the circumferential velocity of the rotational roll is less than 2m/sec.

This argument is directed to the claims as amended and is moot in view of new ground of rejection as necessitated by the amendments.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571) 270-5268. The examiner can normally be reached on M-Th, 0800-1830 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALEXA NECKEL can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795